

I. Iordanoff
Y. Berthier
S. Descartes

Laboratoire de Mécanique des Contacts UMR
INSA-CNRS 5514,
20 Avenue Albert Einstein,
69621 Villeurbanne Cedex

H. Heshmat

Mohawk Innovative Technology, Inc.,
1037 Watervliet-Shaker Road,
Albany, NY 12205-3833

A Review of Recent Approaches for Modeling Solid Third Bodies

The paper considers the behavior of third bodies in dry contacts. A description of the mechanism operating in contacts is given and the influence of external parameters outlined. Both physicochemical and mechanical conditions greatly influence third body behavior. Depending on third-body composition, the external influence can be more or less dramatic. Due to difficulties with experimentation, numerical modeling is suggested as a complementary tool. Two approaches for such modeling are described, the continuum and the discrete approach. At present these models are at an early development stage (two-dimensional simulations), and great efforts should be made for their further development. While an experimental apparatus can study phenomena at only one scale; namely the nanometer with AFM, or the micron to millimeter with fretting machines, modeling is able to range from the microscopic properties (particle interactions like coefficient of restitution) to the macroscopic properties by integration or averaging (load capacity, friction coefficient). [DOI: 10.1115/1.1467632]